

FOLIAR BLIGHT OF SPATHIPHYLLUM CAUSED BY *PHYTOPHTHORA*

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Introduction

In Hawaii and elsewhere, spathiphyllum crops produced by the ornamental potted plant industry suffer from various diseases that have been major limiting factors in the production of vigorous spathiphyllum plants. A rapid kill of many different cultivars characterizes *Cylindrocladium* root and stem infections, although leaf spots are rarely observed. In 1985, another serious disease of spathiphyllum was found at a commercial nursery. Large, black leaf spots and blighted leaves (Figure 1) occurred on mature plants of the cultivar 'Sven Nelson', and microscopic examinations revealed the presence of sporangia (spore-bearing bodies) of a *Phytophthora* species. This study was undertaken to characterize this disease and identify the pathogen.

Disease and Symptoms

The predominant symptoms are large, dark brown to black, irregularly-shaped leaf spots, 10–20 mm in diameter, that rapidly expand to more than 80 mm (Figure 2). Under moist conditions, lesion edges are water-soaked and lesion expansion is very rapid. Under dry conditions, there is a sharp demarcation between the healthy green tissue and black, diseased tissue, and no water-soaking is present. Some yellowing can also occur around the lesions as the leaf matures. Severely diseased leaves may have a thin, white to cream-colored crusty material, which is the spores of the fungal pathogen. Blighted tissue can also become colonized by saprophytic (nonpathogenic) fungi, such as *Colletotrichum*, *Cladosporium*, *Fusarium*, *Phoma*, and many others. Growth of these fungi may change the appearance of the lesions by producing olive-green areas, concentric spore rings, or lighter-colored areas.

Cause and Spread

The causal organism was isolated, cultured, and identified as *Phytophthora nicotianae*. This fungus, commonly called *Phytophthora parasitica*, has been reported to parasitize many

ornamental plants, such as African violet, Barbados aloe, brassia, Thanksgiving cactus, Christmas cactus, and peperomia. In Hawaii, it has been observed on ornamentals such as poinsettia, hibiscus, ti (*Cordyline*), and gerbera; on vegetable crops such as tomato, eggplant, parsley, and bean; on fruit crops such as pineapple, strawberry, and papaya; and on floral crops such as carnation, dendrobium, and Easter lily. *Phytophthora nicotianae* has also been isolated from diseased roots of *Anthurium scherzerianum* (pig-tail anthurium), another plant in the Araceae.

This is the first report of severe foliar damage to spathiphyllum caused by *P. nicotianae* in Hawaii, although the disease has been observed in Florida. In Hawaii, this disease has been observed only at commercial nurseries and has not been seen on spathiphyllum plants growing outdoors as landscape plants.

In controlled tests, the pathogenicity of *P. nicotianae* was confirmed. Foliar lesions began as faint, irregular, water-soaked blemishes (Figure 3). These areas became desiccated and dull gray-green but were very inconspicuous and easily overlooked. After a few more days, the lesions turned into typical dark brown and black expanding lesions (Figure 4). The isolate of *P. nicotianae* obtained from spathiphyllum was highly pathogenic to *A. scherzerianum* in pathogenicity trials (Figure 5). Spathiphyllum cultivars 'Tasson', 'Silver Streak', 'Mini', and 'Wallissii', were all susceptible to *P. nicotianae*.

All phases of the disease cycle and the fungal life cycle are favored by high moisture levels, especially free water. *Phytophthora nicotianae*, like all other *Phytophthora* species, produces motile or swimming spores called zoospores. In the presence of free water, 20 or more swimming zoospores are released from each sporangium (a zoospore-producing structure). Splashed on healthy plants, these zoospores can infect new plants and begin the disease cycle over again. Growth of the fungus and lesion development take place rapidly at temperatures between 24°C and

32°C (75–90°F). Under these same conditions, sporangia are produced in abundance. Diseased leaves, with large blights containing thousands of sporangia, have been collected from commercial nurseries. This demonstrates that conditions ideal for sporulation exist in the tropical environment. Sporangial masses appear white, off-white, or cream-colored and are somewhat crusty to the unaided eye on dried diseased tissue. Microscopic examination is required for determination of

fungus characteristics and identification of the causal organism.

Control

The fungus survives in infected plant parts or as thick-walled spores in the potting medium. Because of the phenomenal ability of *Phytophthora* to multiply and spread rapidly, infected plants must be removed and destroyed to keep inoculum levels as low as possible. Rare and valuable

Figure 1. Blighting and decline of mature *spathiphyllum* plant caused by *Phytophthora nicotianae*.



Figure 2. Spots and blighting of *spathiphyllum* leaves.



Figure 3. Water-soaked spot on *spathiphyllum* 'Silver Streak', showing an early stage of infection.



Figure 4. Uninoculated control, left, and *spathiphyllum* seedling inoculated with *Phytophthora nicotianae*.

cultivars that are infected can be treated and kept isolated but will remain contaminated. It is possible however, to obtain clean plants from mildly infected stock. To do this, the grower should:

1. Keep the growing environment as dry as feasible.
2. Remove all diseased roots, leaves, and other plant parts.
3. Replant into clean potting medium.
4. Drench cleaned transplants with metalaxyl (Subdue 2E) or ethazol (Truban). Repeat monthly.
5. Continue removing any foliar lesions. Discard plants that become severely diseased.
6. When new plantlets develop, carefully remove and inspect for signs of root rot. Take only clean plantlets for transplants. Rinse off potting media in running water. Plant, and drench plantlets with metalaxyl.
7. After plantlets are established, continue inspection for signs of foliar lesions or root rot.
8. NEVER handle diseased plants or contaminated media before touching new plants.
9. Maintain clean plants on a separate bench or in a disease-free greenhouse for stock plants. Discard contaminated stock plantings after clean stocks are established, even if the contamination level is low.

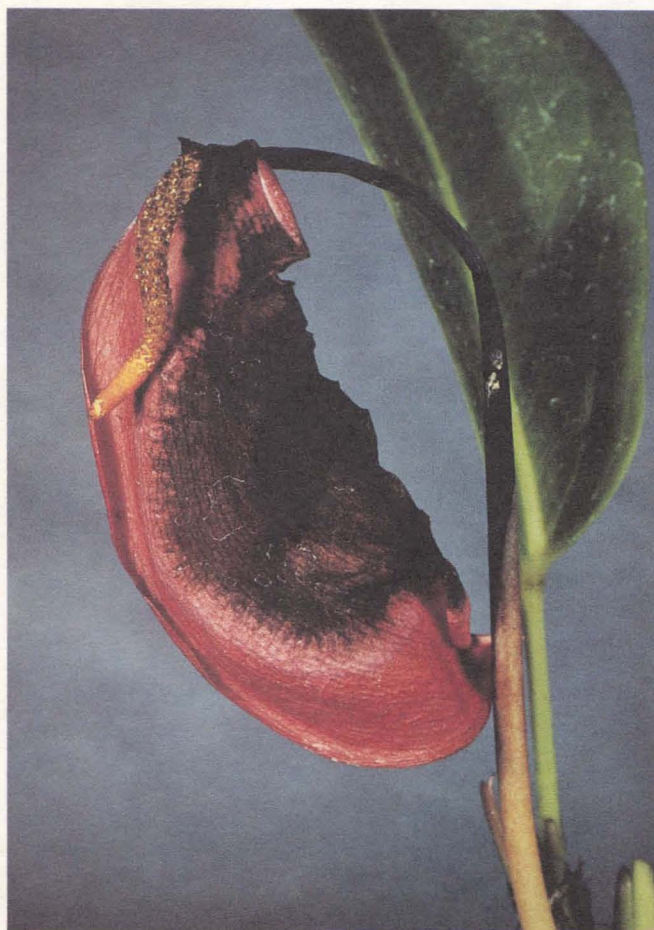


Figure 5. *Anthurium scherzerianum* blight caused by *Phytophthora nicotianae*.

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The author thanks the Governor's Agricultural Coordinating Committee for financial assistance making this research possible.

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12/89